



May 2014

DEFENSE TRANSPORTATION

DOD Needs to Take Actions to Improve the Transportation of Hazardous Material Shipments

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Why GAO Did This Study

Over 3 billion tons of HAZMAT are transported by commercial carriers in the United States each year. DOD accounted for about 1.6 million HAZMAT shipments in fiscal year 2013, using commercial and military carriers. These shipments can be high risk and highly sensitive and if improperly handled, labeled, or packaged could result in the loss of life, property damage, and harm to national security interests.

The National Defense Authorization Act for Fiscal Year 2013 mandates GAO to review DOD's guidance, policies, and procedures regarding HAZMAT shipments. GAO examined the (1) statutes, regulations, guidance, policies, and procedures that govern DOD's handling, labeling, and packaging of HAZMAT shipments to support military operations and (2) extent to which DOD faces any challenges in implementing its policies and procedures for transporting HAZMAT in a safe, timely, and cost-effective manner. GAO examined DOD's and DOT's regulations and related DOD documentation for the transport of HAZMAT and found the 2009-13 data it examined sufficiently reliable for the purposes of the review.

What GAO Recommends

GAO recommends that DOD improve the documentation and secure hold of HAZMAT shipments and examine limitations on data used to select certain HAZMAT carriers. DOD generally agreed with the recommendations but requested one be directed to a different office. GAO agreed and made the associated change.

View [GAO-14-375](#). For more information, contact Cary B. Russell at (202) 512-5431 or russellc@gao.gov.

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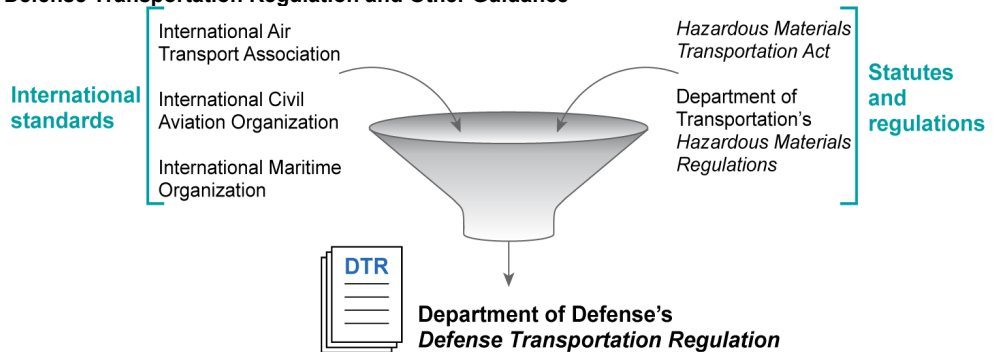
DEFENSE TRANSPORTATION

DOD Needs to Take Actions to Improve the Transportation of Hazardous Material Shipments

What GAO Found

The handling, labeling, and packaging of hazardous materials (HAZMAT) shipments are governed by a complex framework of statutes and regulations prescribed by multiple civilian and military entities (see figure below). The Hazardous Materials Transportation Act is the primary statutory regime governing the transport of HAZMAT in the United States. To implement the act, the Department of Transportation (DOT) issued the Hazardous Materials Regulations. The Defense Transportation Regulation prescribes how the Department of Defense (DOD) is to transport HAZMAT.

Existing Statutory and Regulatory Elements That Department of Defense Incorporated into the Defense Transportation Regulation and Other Guidance



Source: GAO analysis of Department of Defense, Department of Transportation, and international standards for transporting HAZMAT.

DOD has experienced some challenges in implementing HAZMAT regulations and other guidance, which can adversely affect the safe, timely, and cost-effective transportation of HAZMAT. For example, GAO found the following:

- Improper documentation and packaging of HAZMAT led to delays at DOD transportation aerial ports. DOD data show that about 27 percent of HAZMAT received at all five major domestic military aerial ports over the past 5 fiscal years were delayed, primarily due to noncompliant documentation and packaging.
- At least 44 times during fiscal years 2012 and 2013, DOD installations did not provide commercial carriers with access to secure hold areas for arms, ammunition, and explosives shipments or assist them in finding alternatives, as required by DOD regulations. Although there were about 70,891 of these types of arms, ammunition, and explosives shipments in fiscal years 2012 and 2013, not providing secure hold for even a small percentage of these sensitive shipments poses a risk to public safety and national security.
- DOD may determine which carriers should be eligible to transport its most-sensitive HAZMAT shipments using a safety score that lacks sufficient information to reliably assess safety performance for many carriers. DOD uses DOT's Safety Measurement System scores to determine which carriers are eligible to participate in its Transportation Protective Services program. However, in February 2014 GAO found that scores from many carriers lack sufficient safety performance data to reliably compare them with other commercial carriers' scores.

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Abbreviations

DOD	Department of Defense
DOT	Department of Transportation
HAZMAT	Hazardous Materials
TRANSCOM	U.S. Transportation Command

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May 1, 2014

Congressional Committees

Over 3 billion tons of hazardous materials (HAZMAT) are transported by commercial carriers in the United States each year, with an estimated 1.4 million HAZMAT shipments per day.¹ These range from sensitive materials commonly considered to pose a risk to national security (e.g., arms, ammunition and explosives, and nuclear-weapons-related materials) to those associated with everyday use (e.g., chlorine, fire extinguishers, and lithium batteries). HAZMAT at both ends of this spectrum can pose a significant threat to transportation workers, emergency responders, and the general public if the HAZMAT shipment is not properly handled, labeled, and packaged for transportation. Within the United States, the Department of Transportation (DOT) is the primary federal agency responsible for issuing regulations for the safe transport of HAZMAT in intrastate, interstate, and foreign commerce.²

The Department of Defense (DOD) transported approximately 1.6 million HAZMAT shipments in fiscal year 2013 using a mix of commercial and military carriers. The shipments the department transports can be high risk (e.g., explosives and toxins) as well as highly sensitive (e.g., missiles) and, if improperly handled, labeled, or packaged, could result in the loss of life, property damage, and harm to national security interests. DOD relies heavily (for about 90 percent of its total HAZMAT shipments) on commercial carriers to transport HAZMAT both within the United States and worldwide. Within DOD, the U.S. Transportation Command (TRANSCOM) is the functional combatant command charged with

¹A shipment may comprise several deliveries or orders and can use one or more modes of transportation (e.g., by rail and then by air).

²See, e.g., 49 U.S.C. § 5103(b). As used in the Hazardous Materials Transportation Act, “commerce” refers to trade or transportation in the jurisdiction of the United States between a place in a state and a place outside that state; that affects trade or transportation between a place in a state and place outside that state; or on a U.S.-registered aircraft. See 49 U.S.C. § 5102(1). Implementing regulations issued by the Department of Transportation further define the term to include trade or transportation in the jurisdiction of the United States within a single state. See 49 C.F.R. § 171.8.

providing transportation services to the other combatant commands, military services, and defense organizations.³

The National Defense Authorization Act for Fiscal Year 2013 mandates GAO to review DOD's guidance, policies, and procedures for the handling, labeling, and packaging of HAZMAT shipments, including how the guidance, policies, and procedures contribute to the safe, timely, and cost-effective handling of such material, among other matters.⁴ To respond to this mandate, we examined the (1) statutes, regulations, guidance, policies, and procedures that govern DOD's handling, labeling, and packaging of HAZMAT shipments to support military operations and (2) extent to which DOD faces any challenges in implementing its policies and procedures for transporting HAZMAT in a safe, timely, and cost-effective manner.

To examine the statutes, regulations, guidance, policies, and procedures that govern DOD's handling, labeling, and packaging of HAZMAT shipments to support military operations, we reviewed the Hazardous Materials Transportation Act, as amended;⁵ DOT's Hazardous Materials Regulations in Title 49 of the Code of Federal Regulations;⁶ DOD guidance, including relevant sections of the Defense Transportation Regulation⁷ and Joint Publication 4-01—The Defense Transportation System;⁸ and international standards for the transport of HAZMAT. To examine the extent to which DOD faces any challenges in implementing

³Subject to the authority, direction, and control of the Secretary of Defense, the Chairman of the Joint Chiefs of Staff serves as the spokesperson for the commanders of the combatant commands (e.g., TRANSCOM). Communication from the Secretary of Defense to the commanders of the combatant commands is generally transmitted through the Chairman of the Joint Chiefs of Staff. See 10 U.S.C. § 163(a), (b); Department of Defense, *Functions of the Department of Defense and Its Major Components*, Directive 5100.01, para. 4.b(3)(b), (d) (Dec. 21, 2010).

⁴See Pub. L. No. 112-239, § 372 (2013).

⁵Pub. L. No. 93-633, tit. I (1975) (codified as amended at 49 U.S.C. §§ 5101-5128).

⁶The Hazardous Materials Regulations are located in parts 171-180 of Title 49 of the *Code of Federal Regulations*.

⁷Department of Defense, Defense Transportation Regulation 4500.9-R, pt. II, "Cargo Movement," 4500.9-R (Oct. 30, 2013).

⁸Department of Defense, Joint Chiefs of Staff, *The Defense Transportation System*, Joint Publication 4-01 (June 6, 2013).

its policies and procedures for transporting HAZMAT in a safe, timely, and cost-effective manner, we selected and visited several DOD locations involved in transporting HAZMAT, including the U.S. Defense Supply and Distribution Center (Richmond, Virginia); Dover Air Force Base (Dover, Delaware); and Norfolk Naval Base (Norfolk, Virginia). We selected these locations because they provided a cross section of the various modes of transportation and hazardous-material classes. We focused our review on surface and air modes of transport—on surface transport because most individual shipments are transported by highway (94 percent in fiscal year 2013) and on air transport because that mode generally has more-restrictive requirements (e.g., the quantity of certain HAZMAT like acetic acid, a class 8 HAZMAT, allowed on a passenger air transport is lower than other modes due to its corrosive properties). We reviewed data from TRANSCOM's Global Air Transportation Execution System for 5 fiscal years (2009 through 2013) and Defense Transportation Tracking System records for 2 fiscal years (2012 and 2013) to analyze records related to pretransportation and transportation functions (e.g., handling, labeling, and packaging activities and the transport of HAZMAT in commerce to the final destination point), respectively.⁹ We compared data from those records with requirements in the Defense Transportation Regulation and found that the data we examined were sufficiently reliable for the purposes of identifying challenges and the extent to which they affect the transport of HAZMAT. To corroborate our understanding of the documents and data we analyzed, we interviewed officials from the Office of the Secretary of Defense; the Office of the Deputy Assistant Secretary of Defense for Transportation Policy; the Defense Logistics Agency; the Army, the Air Force, the Navy, and the Marine Corps; and DOT's Pipeline and Hazardous Materials Safety Administration. See appendix I for more information on our scope and methodology.

We conducted this performance audit from April 2013 to May 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

⁹Under the Hazardous Materials Regulations, transportation of HAZMAT in commerce begins when the carrier takes physical possession of the HAZMAT for the purpose of transporting it and continues until the package is delivered to the indicated destination. See § 171.1(c).

the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

HAZMAT Overview and Role of the Department of Transportation (DOT)

HAZMAT is any substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, or property when transported in commerce. The Secretary of Transportation designates HAZMAT under the Hazardous Materials Transportation Act and its implementing regulations.¹⁰ Within the federal government, DOT has the primary responsibility to issue regulations for the safe transport of HAZMAT in intrastate, interstate, and foreign commerce.¹¹ To accomplish this mission, DOT issues HAZMAT regulations and provides other services to the transportation community and emergency responders—such as training, enforcement, technical support, information, and policy guidance—to protect the public against the safety risks inherent in transporting HAZMAT.

According to DOT's Office of Hazardous Materials Safety, an estimated 1.4 million HAZMAT shipments are transported in the United States each day on average. These shipments amount to more than 3 billion tons of HAZMAT transported every year. While only about 43 percent of all HAZMAT tonnage is transported by highway, that tonnage accounts for approximately 94 percent of the individual shipments. Air, water, rail, and pipeline constitute the remaining HAZMAT transportation modes, with air generally being the most restrictive (due to aircraft cargo limitations and load restrictions).

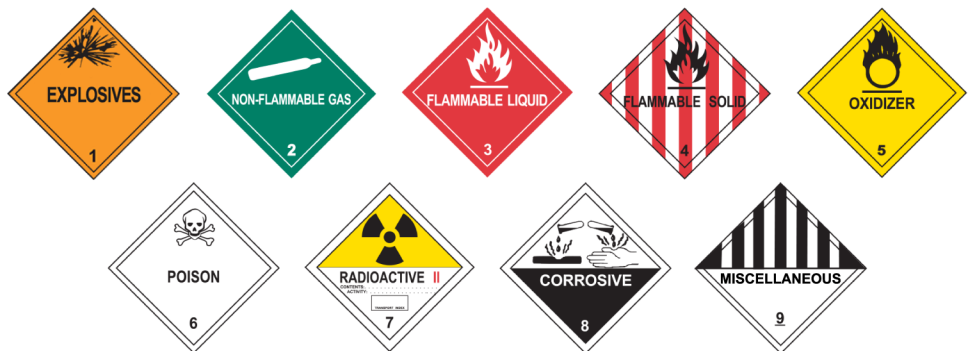
DOT uses a United Nations classification system to categorize all HAZMAT into nine classes and ensure its safe storage, handling, transportation, use, and disposal. Each of the nine HAZMAT classes is defined by a specific set of parameters—usually characterized by chemical properties (e.g., an oxidizer material) or inherent physical properties (e.g., a corrosive material) or as possibly posing a health hazard (e.g., a poisonous substance). Figure 1 shows examples of DOT's labels, warning labels, and hazard warnings for the nine classes of

¹⁰See 49 U.S.C. § 5103(a); 49 C.F.R. § 172.101.

¹¹See § 5103(b); § 171.1.

HAZMAT, which can be further subdivided into divisions (e.g., class 5 is divided into 5.1 and 5.2).¹²

Figure 1: Examples of the Department of Transportation's (DOT) Labels for the Nine Classes of Hazardous Materials (HAZMAT)



Source: DOT.

For example, HAZMAT in these classes could include explosives, which are class 1; gasoline, class 3; and lithium batteries, class 9.¹³

DOD Management of HAZMAT Transportation

TRANSCOM is DOD's single manager for transportation, other than service-unique or theater-assigned assets.¹⁴ The command is composed of three military service component commands that manage the movement of DOD shipments, including HAZMAT—the Army's Military

¹²Fig. 1 provides examples of hazard warning labels for the nine hazard classes and does not include all relevant hazard warning labels.

¹³The Hazardous Materials Regulations also classify certain materials as Other Regulated Material. This class includes materials which, although otherwise subject to the Regulations, present a limited hazard during transportation due to form, quantity, and packaging. See § 173.144.

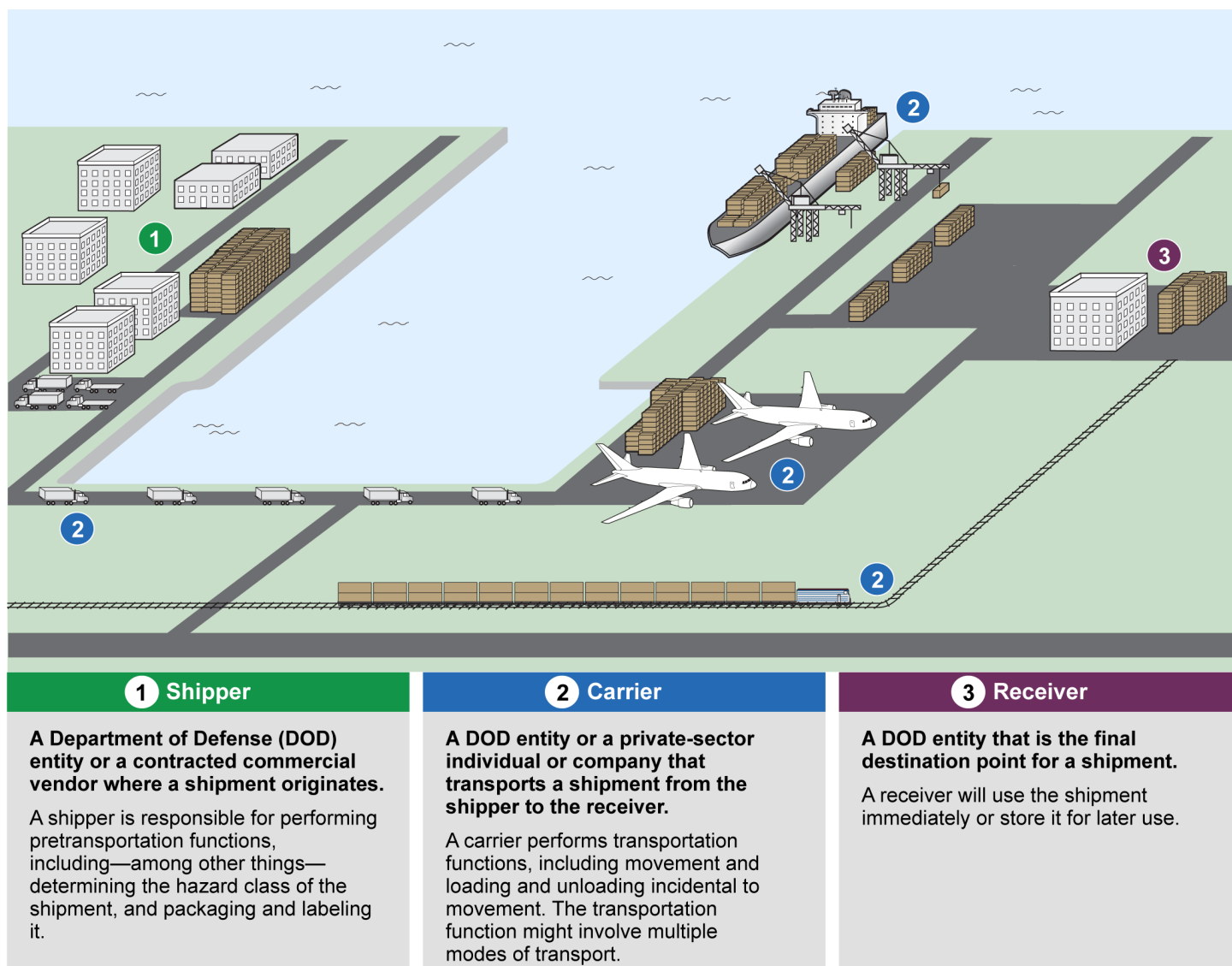
¹⁴In this role, TRANSCOM is responsible for providing common-user and commercial air, land, and sea transportation, terminal management, and aerial refueling to support the global deployment, employment, and sustainment and redeployment of U.S. forces. TRANSCOM is also responsible for procuring commercial transportation services. See Department of Defense, United States Transportation Command (USTRANSCOM), Directive 5158.04, para. 4.6.9 (July 27, 2007) (incorporating change Sept. 11, 2007). TRANSCOM also serves as the DOD Distribution Process Owner, responsible for overseeing the overall effectiveness, efficiency, and alignment of DOD-wide distribution activities. See *id.*, para. 4.6.15.

Surface Deployment and Distribution Command, the Navy's Military Sealift Command, and the Air Force's Air Mobility Command. The Army's Military Surface Deployment and Distribution Command provides worldwide common-use ocean terminal services and traffic-management services, conducts port operations at sealift terminals, and plans, transports, and tracks shipments transported by surface and rail. The Navy's Military Sealift Command transports shipments over water using a mixture of government-owned and commercial ships. The Air Force's Air Mobility Command transports shipments to destinations anywhere around the world by military or commercial carriers by air and serves as the single port manager for common-user aerial ports.

DOD installations, bases, or sites appoint personnel to assist with traffic-management functions. These traffic-management functions include, but are not limited to, providing efficient, responsive, and quality transportation services. These duties also include assisting with the handling, labeling, and packaging of HAZMAT shipments prior to offering them to carriers for transport. Shipments may originate at a vendor (e.g., a manufacturer) or DOD location (e.g., a Defense Logistics Agency depot). Moreover, a manufacturer might use a separate commercial carrier than one used by DOD to deliver its parts to the DOD installation that ordered them.

Shippers, carriers, and receivers carry out the three basic roles of the transportation system. A shipper may be a DOD entity (e.g., the Defense Logistics Agency), or a contracted commercial vendor (e.g., a manufacturer) where a shipment originates. A carrier may be a DOD entity or a private-sector individual or company that transports shipments from the shipper to the receiver. A receiver is the DOD entity that is the final destination point for the shipment. In cases in which shipments are destined for overseas areas, the shipments may be transported through central receiving points, such as one of DOD's five aerial ports or a Defense Logistics Agency depot, before being sent to the final destination point. In figure 2, we list the specific functions that a shipper, carrier, and receiver might perform to transport HAZMAT.

Figure 2: Functions That a Shipper, Carrier, and Receiver Might Perform to Transport Hazardous Materials (HAZMAT) in Commerce



Source: GAO analysis of DOD information.

A shipper is responsible for performing several functions prior to the movement of HAZMAT. These pretransportation functions include, but are not limited to, the following:

- **Determining the hazard class and mode of transportation:** The shipper reviews the Hazardous Materials Regulations to properly identify the hazardous materials in the shipment. This information is needed to

determine the packaging, marking, and labeling,¹⁵ and other requirements for the specific type of HAZMAT being transported.

- Packaging and labeling: Once the mode of transportation has been determined, the shipper selects the appropriate packaging and labeling, fills the package, secures a closure on the package, and affixes the appropriate labels.
- Documentation: HAZMAT shipments that require documentation (as shown in fig. 3 and fig. 4) must describe the HAZMAT and the total quantity of the HAZMAT being shipped, provide emergency response information, and provide certification by the shipper that the HAZMAT is in proper condition for transportation.
- Loading, blocking, and bracing: The HAZMAT package is to be appropriately loaded, blocked, and braced in a freight container or transport vehicle. During this process, the HAZMAT may be segregated in a transport vehicle to ensure that it is not transported with an incompatible shipment.
- Selecting, providing, or affixing placards: The container and the carrier's vehicle are to be properly marked to identify that the vehicle contains HAZMAT.

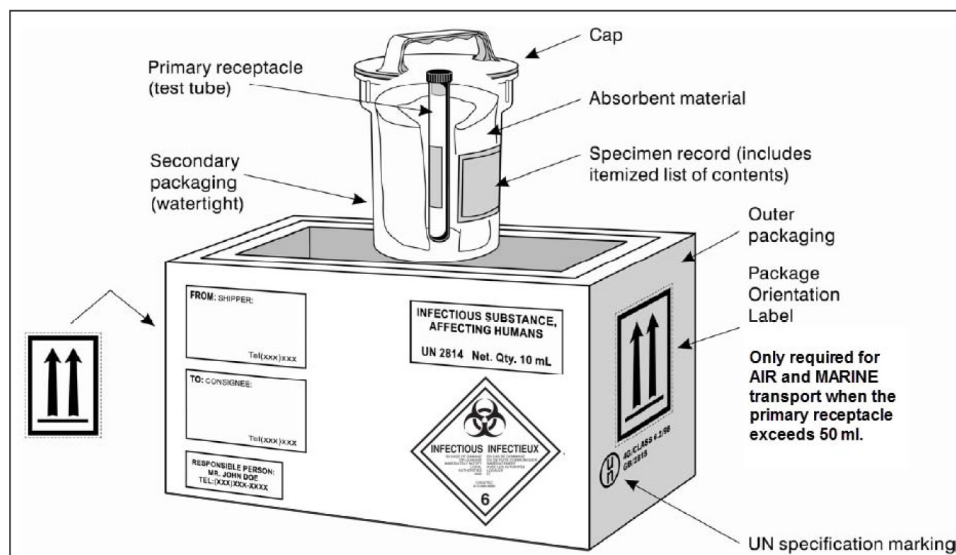
¹⁵For purposes of this report, we use the general phrase packaging and labeling to refer to a variety of pretransportation functions, including selecting, filling, securing, marking, and labeling HAZMAT packaging.

Figure 3: Example of Hazardous Materials (HAZMAT) Documentation Used for Transporting Arms, Ammunition, and Explosives by Air (Shipper's Declaration for Dangerous Goods)

SHIPPER'S DECLARATION FOR DANGEROUS GOODS							
Shipper's information		TRAFFIC MANAGEMENT FLIGHT 5236 CHASE ST WRIGHT PATTERSON AFB, OH 45433-5501 PHONE NUMBER: (793) 257-4409 DSN: 787-4409				Air Waybill No. Page 1 of 1 Pages Shipper's Reference Number (optional) FB230001809002XXX	
Recipient's information		FB 5612 435 ABW LRS RAMSTEIN AB, GERMANY					
Person Responsible for Shipment: Two completed and signed copies of this Declaration must be handed to the operator.						WARNING Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.	
TRANSPORT DETAILS							
This shipment is within the limitations prescribed for: <i>(delete non-applicable)</i> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">PASSENGER XXXX X</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">CARGO AIRCRAFT ONLY</div> </div>						Airport of Departure DOV DOVER AFB, DE	
Airport of Destination RAMSTEIN AB, GERMANY						Shipment Type <i>(delete non-applicable)</i> NON-RADIOACTIVE XXXXX	
NATURE AND QUANTITY OF DANGEROUS GOODS							
Dangerous Goods Identification							
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instructions	Authorization	
UN032	Cartridges for Weapons	1.2.1E	II	1 Wooden pallet X 221.467 KG NEW	A5.12		
Additional Handling Information							
Emergency Telephone Number: (703) 697-0218/0219				Name/Title of Signatory: George Jones Transportation Officer			
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to the applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.				Place and Date: WP AFB, OH 45433 3 Jan 2011 Signature: _____ <i>(see warning above)</i>			

Source: TRANSCOM.

Figure 4: Example of Documentation and Packaging Used for Transporting a Biological Sample (HAZMAT Class 6)



Source: Army Institute of Public Health.

Once a shipper has completed the required pretransportation functions, a carrier takes possession of the HAZMAT shipment and performs the transportation functions.¹⁶ Transportation functions include the movement, loading incidental to movement, unloading incidental to movement, and storage incidental to movement.¹⁷ Transport may involve a single mode of transport (e.g., by highway or aircraft) or it can be

¹⁶Under the Hazardous Materials Regulations, transportation of HAZMAT in commerce begins when the carrier takes physical possession of the HAZMAT for the purpose of transporting it and continues until the package is delivered to the indicated destination. See § 171.1(c).

¹⁷See § 171.1(c)(1)-(4). Under the Hazardous Materials Regulations, loading incidental to movement includes loading packaged or containerized HAZMAT for the purpose of transportation when performed by carrier personnel or in the presence of carrier personnel. See § 171.1(c)(2). Unloading incidental to movement includes removing HAZMAT when performed by carrier personnel or in the presence of carrier personnel. See § 171.1(c)(3). Storage incidental to movement involves the storage of a transport vehicle, freight container, or package containing HAZMAT by any person between the time that a carrier takes physical possession of the HAZMAT for the purpose of transporting it until the package has been delivered to the indicated destination. It does not include storage of HAZMAT at its final destination. See § 171.1(c)(4).

multimodal—for example, moving first by surface (by highway or rail) and then through a central receiving point, such as an aerial port (for aircraft) or a depot. At the end of the transportation function, a carrier delivers the HAZMAT shipment to its final destination point, where a receiver takes possession of the HAZMAT shipment for immediate use or storage for later use.¹⁸

The Handling, Labeling, and Packaging of DOD HAZMAT Shipments Is Governed by a Complex Framework of Statutes and Regulations

A Complex Framework of Statutes and Regulations Governs DOD's Handling, Labeling, and Packaging of HAZMAT Shipments

When transporting HAZMAT, there is a complex framework of statutes and regulations prescribed by multiple civilian and military entities that must be considered and evaluated to ensure safe, secure, and efficient transport. The Hazardous Materials Transportation Act, enacted in 1975 and since amended,¹⁹ is the primary statutory regime governing the transport of HAZMAT in the United States. The purpose of the act is to protect against the risks to life, property, and the environment that are inherent in the transport of HAZMAT in intrastate, interstate, and foreign commerce.²⁰ To implement the act, DOT issued the Hazardous Materials Regulations, located in Title 49 of the Code of Federal Regulations, which generally govern the handling, labeling, packaging, and transportation of

¹⁸The Hazardous Materials Regulations do not apply to unloading HAZMAT from a transport vehicle or bulk packaging performed by the recipient following delivery by the carrier and after the carrier has departed. The regulations also do not apply to storage of a freight container, transport vehicle, or package containing HAZMAT after delivery to the indicated destination. See § 171.1(d)(2), (3).

¹⁹Pub. L. No. 93-633, tit. I (1975) (codified as amended at 49 U.S.C. §§ 5101-5128).

²⁰49 U.S.C. § 5101.

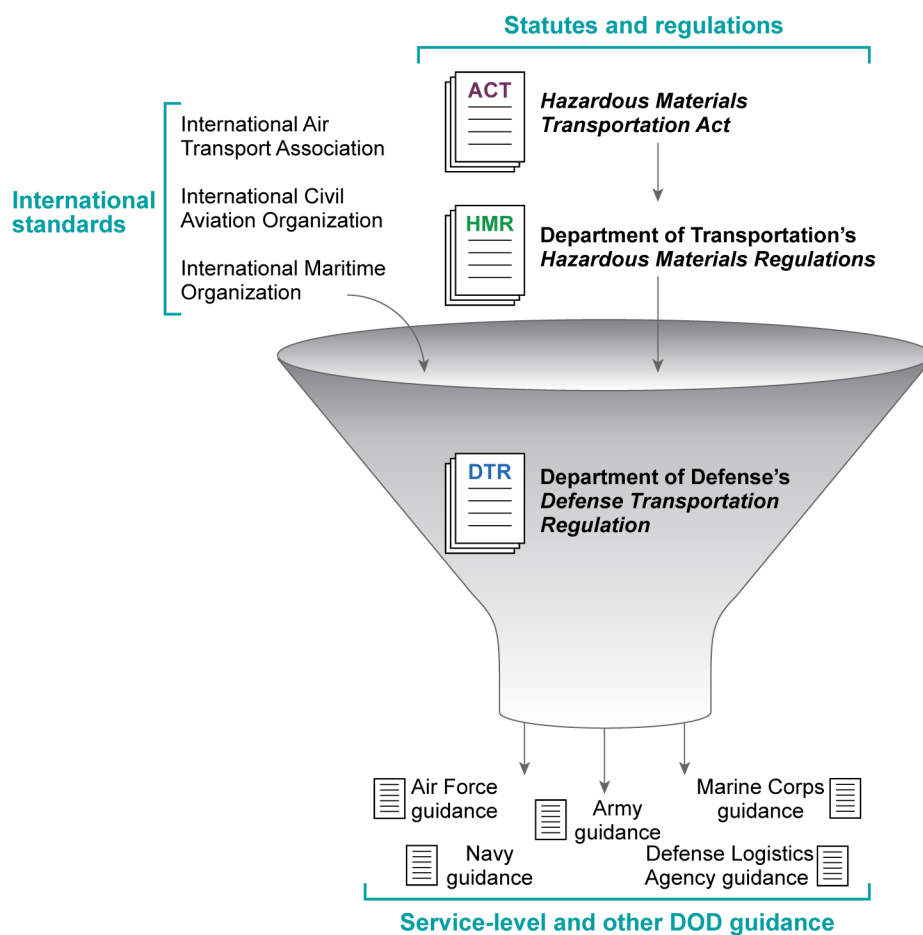
HAZMAT shipments in commerce, among other activities.²¹ The regulations include specific guidance pertaining to each of the nine classes of HAZMAT on the basis of their composition, level of danger, and mode of transport. With regard to DOD, the Defense Transportation Regulation prescribes how DOD is to transport HAZMAT. Specifically, the Defense Transportation Regulation incorporates or references requirements from DOT's Hazardous Materials Regulations,²² as well as various international- and country-specific regulations or standards for transporting HAZMAT shipments by air and water.²³ In figure 5, we illustrate the statutory and regulatory elements that govern DOD's handling, labeling, and packaging of HAZMAT shipments.

²¹ See generally 49 C.F.R. pts. 171-180.

²² The Hazardous Materials Regulations do not apply to the transport of HAZMAT in a motor vehicle, aircraft, or vessel operated by a federal, state, or local government employee solely for noncommercial federal, state, or local government purposes. § 171.1(d)(5). However, through the Defense Transportation Regulation, DOD has generally applied the Hazardous Materials Regulations to shipments, whether conveyed by commercial or military carriers. See Department of Defense, Defense Transportation Regulation 4500.9-R, pt. II, ch. 204, *Hazardous Materials*, para. A.1 (Aug. 16, 2013). Section 173.7(b) of the Hazardous Materials Regulations also contains an exception for HAZMAT shipments made by or under the direction or supervision of the Department of Energy or DOD for the purpose of national security, subject to certain requirements. See § 173.7(b). The Defense Transportation Regulation notes that this provision may only be used under a special program approved by a service or DOD component, service, or agency headquarters, and providing equal or better protection than the normal DOD, service, or DOT rules during transport. See Department of Defense, Defense Transportation Regulation 4500.9-R, pt. II, ch. 204, para. C.4.

²³ DOD guidance references International Air Transport Association, International Civil Aviation Organization, and International Maritime Organization technical instructions, codes, and regulations. The International Air Transport Association is the trade association for the world's airlines, representing about 240 airlines, or 84 percent of total air traffic. The International Air Transport Association supports many areas of aviation activity and helps formulate industry policy on critical aviation issues. A specialized agency of the United Nations, the International Civil Aviation Organization was created in 1944 to promote the safe and orderly development of international civil aviation throughout the world, among other objectives. It sets standards, recommended practices and procedures, and other guidance for aviation safety, security, efficiency, and regularity, as well as for aviation environmental protection. The organization serves as the forum for its 191 member states regarding cooperation in all fields of civil aviation. The International Maritime Organization is a specialized agency of the United Nations with 170 member states, whose primary purpose is to develop and maintain a regulatory framework for shipping. The International Maritime Organization's issues of concern include safety, the environment, legal matters, technical cooperation, maritime security, and efficiency.

Figure 5: Existing Statutory and Regulatory Elements That DOD Incorporated into the Defense Transportation Regulation and Other Guidance



Source: GAO analysis of Department of Defense (DOD), Department of Transportation (DOT), and international standards for transporting HAZMAT.

Applying the different regulations governing the transportation of a specific HAZMAT class to the mode of transportation can be complex for service transportation officials and requires careful reading of all applicable regulations. As an example, when shipping acetyl chloride (flammable liquid, class 3 HAZMAT) the shipper must review several sources to determine how to properly ship the item. If the shipper intends to ship the HAZMAT on a commercial aircraft carrying passengers, the Hazardous Materials Regulations indicate that no more than 1 liter of this liquid per package can be shipped because of the risk posed by transporting HAZMAT of that classification. If the HAZMAT is being

shipped by military aircraft or on an international flight, additional requirements and limitations may need to be applied. On the other hand, if carriers transport acetyl chloride by highway, they may be able to transport greater quantities.

DOD may also ship DOD-unique HAZMAT items that are not addressed in DOT's Hazardous Materials Regulations or for which DOD needs to seek a waiver or approval. In these cases, the Hazardous Materials Regulations and DOT guidance specify a process that any commercial or government entity can use to apply for a DOT waiver in the form of a special permit or approval providing relief from requirements in the Hazardous Materials Regulations.²⁴ DOD shipments may also use certificates of equivalence, which are approvals issued by DOD itself in instances where a packaging design differs from the requirements of the Hazardous Materials Regulations. Certificates of equivalence certify that the packaging equals or exceeds the comparable requirements of the Hazardous Materials Regulations.²⁵ DOD shippers can use special permits or approvals from DOT or certificates of equivalence from DOD to handle department-unique HAZMAT shipments in a way commensurate with the DOT requirements.²⁶ For example, according to officials, missiles transported in certain configurations are not standard items covered by the Hazardous Materials Regulations. Therefore, DOD obtained an

²⁴A special permit allows a person to perform a function not otherwise permitted under the Hazardous Materials Regulations. See § 107.1. An application for a special permit may be granted if it demonstrates, among other things, that the proposed alternative will achieve a level of safety that is at least equal to that required by the relevant regulation or, if the regulations do not establish a level of safety, is consistent with the public interest and adequately will protect against the risks to life and property inherent in transportation. See § 107.113(f)(2). In some instances, when required by regulation or international standard, DOD may alternatively need to seek a competent authority approval. As explained by DOD guidance, a competent authority approval is a written approval for specific HAZMAT which requires approval of the hazard classification or the packaging by a national competent authority prior to shipment. DOT is the competent authority for the United States. See Defense Transportation Regulation 4500.9-R, pt. II, ch. 204, para. H.1.b (Aug. 16, 2013).

²⁵See, e.g., Defense Logistics Agency, *Packaging of Hazardous Material*, Directive 4145.41 (Interservice), para. 4.14 (Oct. 22, 2007) (incorporating change Apr. 1, 2010) 49 C.F.R. § 173.7(a).

²⁶According to TRANSCOM officials, under most circumstances DOD at a minimum meets or exceeds the requirements contained in the Hazardous Materials Regulations and applies for waivers like other commercial shippers for HAZMAT items not specifically identified in the Hazardous Materials Regulations.

approval from DOT that indicates the type of packaging and container to be used to transport this item, which, according to officials, is equal to or exceeds the requirements of the Hazardous Materials Regulations. Similarly, for new items that are not mentioned in the Hazardous Materials Regulations, such as certain DOD-specific or emerging HAZMAT (e.g., lithium batteries with a metal casing) DOD might obtain a waiver that identifies how these items will be packaged and transported.

DOD Has Developed Regulations and Other Guidance for Circumstances Unique to the Department

In addition to the statutory and regulatory elements discussed above, DOD has developed additional guidance to address specific circumstances that are either not covered in the existing framework of statutes and regulations or are areas where the department believes additional or different requirements are needed. For example:

- The Defense Transportation Regulation addresses the policies, procedures, and responsibilities for transporting HAZMAT by military aircraft.²⁷ Additionally, Air Force Manual 24-204 (Interservice) identifies procedural exceptions in the context of tactical, contingency, or emergency airlift.²⁸ Because of the increased risk to the aircraft, aircrew, and participants, these procedural exceptions must only be used when there is a validated operational requirement. For example, in certain circumstances DOD may be able to use a single Shipper's Declaration for Dangerous Goods to identify and certify more than one type of hazardous material when shipped under a single tracking number.
- For arms, ammunition, and explosives and certain classified shipments, the Defense Transportation Regulation contains requirements, procedures, and responsibilities related to the Transportation Protective Services program. Transportation Protective Services include a series of safeguards additional to those found in the Hazardous Materials Regulations such as, depending on the shipment, satellite tracking of the carrier vehicle using the Defense Transportation Tracking System and the use of two drivers with

²⁷Policies, procedures, and responsibilities for transporting HAZMAT by military aircraft are identified in DOD guidance including Air Force Manual 24-204 (Interservice)/TM 38-250/NAVSUP PUB 505/ MCO P4030.19J/DLAI 4145.3, *Preparing Hazardous Materials for Military Air Shipments* (Dec. 3, 2012) (hereinafter Air Force Manual 24-204 (Interservice)) and the Defense Transportation Regulation.

²⁸See generally Air Force Manual 24-204 (Interservice), ch. 3.

security clearances to provide constant surveillance. TRANSCOM's Surface Deployment and Distribution Command provides approval for certain commercial carriers to offer these Transportation Protective Services after determining that they meet safety performance thresholds, among other requirements.²⁹

- According to Army health officials, the Defense Transportation Regulation also contains more-stringent training requirements for personnel shipping medical HAZMAT. As described by officials, the Defense Transportation Regulation and other guidance requires medical personnel who package and ship hazardous materials be trained and certified to do so at one of the DOD-approved hazardous-materials transportation courses. Specifically, the Defense Transportation Regulation indicates that anyone involved with the transportation of pathogens or etiologic agents who manages, packages, certifies, or prepares laboratory samples and specimens or regulated medical waste for transport by any mode may satisfy the training requirement through specific courses offered by the Army Public Health Command.³⁰ According to officials, these training requirements extend to those personnel who package and ship biological select agents and toxins as well.³¹

²⁹See Surface Deployment and Distribution Command, *Military Freight Traffic Unified Rules Publication-1* (MFTURP-1) (June 3, 2013).

³⁰See Defense Transportation Regulation 4500.9-R, pt. II, ch. 204, para. D.1.d (Aug. 16, 2013). An etiologic agent is a viable microorganism or its toxin that causes, or may cause, human disease.

³¹DOD guidance for safeguarding biological select agents and toxins states that, during the planning and preparation stages of off-station transportation of these agents and toxins, a current risk assessment shall be made including known threats and hazards. Planning for the move is to include appropriate security measures, and all reasonable precautions must be taken to ensure the safety and security of personnel and the agents and toxins. Department of Defense Instruction 5210.89, *Minimum Security Standards for Safeguarding Biological Select Agents and Toxins*, encl. 3, para. E3.7.5 (Apr. 18, 2006).

DOD Has Experienced Some Challenges in Implementing HAZMAT Policies and Procedures, Which Can Adversely Affect the Safe, Timely, and Cost-Effective Transportation of HAZMAT

According to TRANSCOM officials, in general DOD HAZMAT shipments arrive at their final destination without incident or delay; however, the department faces some challenges ensuring the safe, timely, and cost-effective transportation of some HAZMAT shipments. According to DOD data, for HAZMAT transported by surface and air, improper documentation and packaging have led to transportation delays. In a limited number of instances with a potential for public safety and national security consequences, DOD installations did not provide carriers transporting sensitive arms, ammunition and explosives HAZMAT with access to secure hold areas or assist them in locating the nearest alternate means to secure those shipments. In addition, the reliability of safety performance data calls into question DOD's process for selecting eligible, and evaluating current, HAZMAT carriers to transport arms, ammunition, explosives, and sensitive and classified shipments.

DOD HAZMAT Shipments Were Improperly Documented and Packaged

According to DOD information that we analyzed for air and surface HAZMAT shipments³² and according to officials, a substantial number of HAZMAT shipments were not documented and packaged in accordance with the Defense Transportation Regulation, which resulted in delays. To ensure the safe and secure transport of HAZMAT, DOD delayed the transport of these shipments until the documentation or packaging issues were resolved. According to agency officials we interviewed, these shipment delays can be as short as a few hours or last several weeks, depending on the nature of the issue. For example, regarding HAZMAT shipments to be transported by air, Global Air Transportation Execution System data show that, of the 246,747 total shipments of HAZMAT received at all five major domestic military aerial ports for fiscal years 2009 through 2013, 67,149 shipments (or 27 percent) were delayed—primarily because they were not in compliance with the Defense Transportation Regulation requirements for documentation and packaging.³³ While the Surface Deployment and Distribution Command

³²The DOD data that we reviewed did not contain shipments carried by small-package carriers.

³³The Department of Defense uses the Global Air Transportation Execution System at 19 aerial ports and 139 active remote and deployed sites worldwide to document the transport of shipments. The system also, among other things, supports the processing of those shipments, reports in-transit tracking data, and tracks the data necessary for billing to Air Mobility Command's financial-management directorate.

data are not aggregated in the same format as the air shipment data, according to agency officials, improper documentation and packaging cause some delays in transportation of surface HAZMAT shipments. According to DOD officials, improper documentation and packaging also result in delays for the sea transportation mode.³⁴ Agency officials stated that the specific documentation and packaging issues that resulted in delays varied. Following are examples that illustrate the types of instances that we identified during the course of our review in which, according to officials, the documentation and packaging of HAZMAT shipments were not in compliance with the Defense Transportation Regulation requirements and resulted in delays:

- Improper documentation (air): At a major aerial port we visited, we identified examples of HAZMAT shipments containing acetaldehyde (flammable liquid, class 3 HAZMAT) that were delayed because, according to officials, they were missing the Shipper's Declaration for Dangerous Goods. The Defense Transportation Regulation requires that when transporting HAZMAT by air, the shipper must complete a Shipper's Declaration for Dangerous Goods for the shipment. In another example, at a depot we visited, we identified various HAZMAT shipments of lithium batteries that were also delayed because, according to officials, they had improper HAZMAT shipping names on the bill of lading.
- Improper documentation (surface): We found instances of similar documentation problems for surface transportation that led to HAZMAT transportation delays. Reviewing examples of Transportation Discrepancy Reports—which are used to document shipper-related discrepancies, among other things—we found that improper documentation is a major cause for delays. For example, in the reports we found instances where the required Dangerous Goods Declaration forms were missing and where the proper HAZMAT material name was not included with the shipment as required by the Defense Transportation Regulation.
- Improper packaging (air): At a major aerial port we visited, we identified a shipment of rusted acetylene (flammable gas, class 2.1 HAZMAT) gas cylinders that were delayed in transport because, according to officials, they had arrived at the aerial port improperly packaged—stacked on top of one another in lidless wooden boxes

³⁴Our review focused on freight motor (truck) surface and air transportation. Specific rail and sea ports data were not analyzed.

(see fig. 6). According to military aerial port officials, to comply with the requirements of the Defense Transportation Regulation the rusted cylinders need to be recertified to ensure the integrity of the packaging before they are safe for air transport and may not be stacked on top of one another. Officials told us that, as a result of improper packaging, the potentially dangerous acetylene cylinders were delayed at the aerial port until the packaging discrepancies could be resolved by the shipper.

Figure 6: Shipment of Improperly Packaged, Rusted Acetylene Gas Cylinders Delayed in Transport



Source: GAO.

- Improper packaging (air): We observed a dented drum of flammable, toxic liquid (class 3 HAZMAT) that aerial port officials identified as improperly packaged under the Defense Transportation Regulation because of its potential to leak (see fig. 7). The military aerial port officials pointed out that, when transported by air, leaking HAZMAT drums can cause serious damage to DOD personnel and aircraft transporting them.

- Improper packaging (surface): Similarly, reviewing samples of Transportation Discrepancy Reports, we found instances of improper packaging. For example, we found a report of a shipment of helium gas (nonflammable gas, class 2.2 HAZMAT) in a container that, according to the report, was not properly secured (blocked and braced) for shipment. Another report identified an instance where a grenade (explosive, class 1.1 HAZMAT) arrived inside an armored vehicle instead of proper packaging for an explosive. Additionally, we found a report of a bottled oxygen (nonflammable gas, class 2.2 HAZMAT) shipment that arrived via highway improperly packaged for air shipment. According to the report, the material must be packed in a flame penetration and thermal-resistant package aboard an aircraft to prevent a potentially serious accident.

Figure 7: Shipment of Improperly Packaged Flammable, Toxic Liquid Delayed in Transport



Source: Air Force.

During the course of our review, DOD officials pointed out several potential causes for these types of noncompliance. While the DOD officials we interviewed provided information about specific HAZMAT shipment delays, none stated a holistic understanding of the root causes resulting in HAZMAT transportation delays. Specifically we found the following:

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- DOD officials from a surface port we interviewed told us that some DOD personnel and commercial shippers lack experience and training on HAZMAT documentation and packaging. Additionally, at an aerial port, officials believed that some commercial shippers also lacked familiarity with DOD HAZMAT documentation and packaging requirements and some shippers did not have HAZMAT-certified personnel to ensure proper HAZMAT documentation and packaging.
 - Aerial port officials told us that normal personnel rotations exacerbated training problems because experienced personnel regularly moved to other positions, leaving less-experienced personnel behind to document and package HAZMAT shipments.
 - Aerial port officials also told us that shippers have limited incentives to comply with DOD regulations because the aerial port itself has no way to discipline shippers that regularly transported improperly documented or packaged HAZMAT shipments knowing that in some cases the aerial port would fix the shipment.
 - At another aerial port and DOD installation we visited, officials reported that miscommunication among the shipper, carrier, or receiver (incorrect shipping address or modes of transportation needed to transport the shipment) causes delays for HAZMAT shipments.

Additionally, DOD officials at the surface and aerial ports we visited noted that they lacked the ability or authority to correct the root causes they suspected to be the source of delays. As a result, when a HAZMAT shipment arrives with improper packaging, DOD officials at these ports can either correct the problem themselves by repackaging the shipment or attempt to contact the shipper to correct the issue.

In 2008, the Office of the Deputy Assistant Secretary of Defense for Transportation Policy commissioned a study to address DOD's unacceptable level of delayed HAZMAT shipments. According to the Frustrated Cargo Analysis Final Project Report, the study's scope was to reduce the effect of these delays by first defining the scope of the problem, developing a consensus on root causes, and providing a data-centric solution to the problems. While the 2008 report had several findings that identified causes for delays, including improper documentation and packaging of HAZMAT at an aerial port and a distribution depot, DOD has not resolved the problems addressed in that report or followed up on those findings with a more-recent analysis of the root causes for the delays that the department continues to experience. Moreover, we visited one of the sites identified in the report and observed that the same causes for delays with regard to documentation and

packaging of HAZMAT persisted at that location. Additionally, we visited a different distribution depot and noted the same causes for delays.

According to the Office of Management and Budget's Management's Responsibility for Internal Control,³⁵ federal agencies should establish or maintain internal control to achieve effective and efficient operations and compliance with applicable regulations—in this case, the Defense Transportation Regulation and related guidance. Moreover, federal internal control standards call for agency management officials to promptly evaluate findings from audits and other reviews showing deficiencies, determine proper actions in response to those findings and recommendations, and complete, within established time frames, all actions that correct or otherwise resolve the matters brought to management's attention.³⁶ However, DOD has not conducted a recent, holistic analysis to determine the root causes for the significant number of delays in HAZMAT shipments resulting from improper documentation and packaging. DOD officials acknowledged that they do not have this current information and agreed that it would be helpful in identifying and addressing issues causing delayed HAZMAT shipments. Without such information, DOD cannot adequately ensure compliance with the Defense Transportation Regulation. These delays have resulted in DOD's committing resources—personnel, storage space, and packing materials—to ensure that the delayed cargo can ultimately be transported safely.

³⁵Office of Management and Budget, *Management's Responsibility for Internal Control*, Circular No. A-123 (Dec. 21, 2004).

³⁶GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (November 1999).

DOD Installations Have Not Secured Sensitive Arms, Ammunition, and Explosives Shipments Delivered by Highway in a Timely Manner

According to reports from the Surface Deployment and Distribution Command Operations Center's Defense Transportation Tracking System, DOD installations did not provide commercial carriers access to a secure hold area for at least 44 out of 70,891 sensitive arms, ammunition, and explosives shipments or did not assist carriers in finding alternative means to secure those shipments in fiscal years 2012 and 2013.³⁷

Although these instances represent a relatively small percentage of the overall number of sensitive arms, ammunition, and explosives shipments, not providing secure hold for even a small percentage of these sensitive shipments poses a risk to public safety and to national security. While we found no evidence of severe incidents resulting from these instances where commercial carriers transporting sensitive HAZMAT were not provided access to secure hold areas, the potential high-risk consequences to public safety and national security of this type of failure are significant. A secure hold area is a location designated for the temporary parking of carrier vehicles transporting DOD-owned arms, ammunition, and explosives and other sensitive material.

According to the Defense Transportation Regulation, DOD installations are to assist commercial carriers transporting DOD shipments of arms, ammunition, and explosives by providing secure hold areas in the interest of public safety and national security, or routing them to the nearest location that has a secure hold area. If an installation cannot accommodate the vehicle, personnel at the installation are to assist the carrier in locating the nearest alternate DOD installation or contractor activity capable of providing a secure hold area. At DOD installations that provide a secure hold area, DOD guidance regarding the security of conventional arms, ammunition, and explosives provides that shipments arriving after normal working hours or during nondelivery hours are to be accepted by the installation and provided secure hold protection commensurate with the sensitivity category of the items.³⁸ At DOD installations that cannot or choose not to provide secure holding areas, DOD personnel are to assist the carrier with routing to the nearest DOD

³⁷The Surface Deployment and Distribution Command only collects information on arms, ammunition, and explosives secure-hold access issues when the DOD installation or Transportation Protection Service carrier report them. According to officials, there are likely many other access issues that were not reported.

³⁸See Department of Defense, *Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives (AA&E)*, Manual 5100.76, encl. 10, para. 7.a (Apr. 17, 2012).

location (or other approved location such as a carrier-owned facility) that can provide secure hold.

To determine which DOD installations have the ability to provide secure hold, shippers and carriers use the Transportation Facilities Guide. The Transportation Facilities Guide lists DOD installation information including those that offer secure hold areas and their hours of operation, among other things. DOD installations are required to update their Transportation Facilities Guide records immediately whenever critical operational changes are made, such as changes in operating hours or installations closures. Otherwise, installations update the guide on a semiannual basis if the installation is participating in the secure hold area program and annually if it is not. However, even with the tools DOD makes available to DOD personnel, shippers, and carriers, some carriers of arms, ammunition, and explosives shipments are not able to gain access to secure hold areas.

To find examples of instances where carriers were not provided secure hold or assisted with finding alternate locations, we examined descriptions reported in DOD's Defense Transportation Tracking System Emergency Response Reports. Following are examples of instances in which DOD installations did not provide access to a secure hold area to carriers transporting sensitive and classified HAZMAT:

- A commercial carrier (i.e., a truck) transporting a shipment of ammunition, explosives, and fireworks arrived at its final destination point after normal working hours and was denied access to the installation. DOD personnel at the final destination point directed the carrier to another DOD installation for secure hold, but no one at that installation answered the carrier's calls requesting secure hold for the night. Despite the carrier's efforts to inform DOD personnel of the security requirements for arms, ammunition, and explosives shipments, the carrier was denied secure hold for the shipment and spent the night in his truck with the shipment in an empty parking lot near the highway. According to the Defense Transportation Regulation, temporary parking for certain arms, ammunition, and explosive shipments should be conducted at DOD-approved or commercially owned secure holding facilities.
- A DOD installation denied a commercial carrier access to a secure hold area for a shipment of thousands of pounds of aircraft flares and directed the carrier to park at a nearby major retail store parking lot. DOD personnel told the Surface Deployment and Distribution Command Operations Center that they regularly send carriers arriving

after hours to this retail store or a nearby rest area. Parking arms, ammunition, and explosives at either location may be inconsistent with DOD guidance.

- DOD personnel at a secure hold installation instructed a commercial carrier of a small-arms and parts shipment to arrive before the installation closed because they would not accept after-hours shipments. Furthermore, DOD personnel explained that the installation was located in an unsafe neighborhood and advised the carrier to park in a safe public parking lot away from the installation if arriving after hours. Observing that the shipment would arrive after hours, the carrier decided to spend the night in his truck with the shipment parked at a public truck stop near the interstate highway. The Defense Transportation Regulation indicates that personnel at the DOD installation should assist the commercial carrier in identifying another location that could provide secure hold.

According to the Defense Transportation Regulation, when commercial carriers experience challenges gaining access to a secure hold area, the carrier or DOD installation personnel can contact the Surface Deployment and Distribution Command for assistance. According to officials, Operations Center personnel are to attempt to resolve the issue by referring to relevant regulations such as the Defense Transportation Regulation, DOD Manual 5100.76-M (Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives), or rerouting the shipment to another DOD location that can provide secure hold for the shipment. However, if the installation and Operations Center personnel cannot resolve the issue and grant carriers access to the secure hold area, Operations Center personnel are to generate an Emergency Response Report to document the actions taken by both parties and store those reports in the Defense Transportation Tracking System. According to the Surface Deployment and Distribution Command officials, Operations Center personnel forward the Emergency Response Reports to military-service representatives through an ad hoc process. However, according to the officials, no further corrective action is required by those representatives. As an example, during our visit the Operations Center personnel demonstrated several examples of recent incidents where they generated an Emergency Response Report as a result of DOD installation personnel denying a carrier access to a secure hold area or not assisting them in locating the nearest alternate means to secure those shipments.

While the Surface Deployment and Distribution Command's Emergency Response Reports document installation and carrier issues gaining access to secure hold areas at some DOD installations, according to

Surface Deployment and Distribution Command officials they lack authority to change or require corrective actions to installation access policies. According to these officials, such actions would be taken by the military services or individual installation commanders. However, officials told us that there is no process within the installations' commands—which set installation access policies—that requires them to follow up on Emergency Response Reports to identify needed improvements or recommend any corresponding corrective action at installations identified in the reports. However, the Office of Management and Budget's Management's Responsibility for Internal Control provides that management is responsible for establishing and maintaining internal control to achieve objectives such as compliance with applicable laws and regulations. It further notes that agencies and individual federal managers must take systematic and proactive measures to, among other things, assess the adequacy of internal control in federal programs and operations, identify needed improvements, and take corresponding corrective action. Without such a process, DOD may not be able to minimize the time that sensitive arms, ammunition, and explosives shipments spend in public areas.

DOT Safety Measurement System Used by DOD to Evaluate Transportation Protective Service Carriers Lacks Sufficient Information to Reliably Compare Safety Performance Across Carriers

To ensure the safety and security of DOD's shipments of sensitive arms, ammunition, explosives, and classified shipments, DOD established a Transportation Protective Services program as part of the Surface Deployment and Distribution Command. Among other requirements to participate in the program, commercial carriers providing certain services must meet safety performance thresholds defined in DOD guidance using scores from DOT's Compliance, Safety, Accountability program, which is managed by DOT's Federal Motor Carrier Safety Administration.³⁹ Specifically, DOD uses the Federal Motor Carrier Safety Administration's Safety Measurement System scores—one component of the Compliance, Safety, Accountability program—to determine which carriers are eligible to participate in the department's Transportation Protective Services

³⁹See Surface Deployment and Distribution Command, *Military Freight Traffic Unified Rules Publication-1* (MFTURP-1). The Defense Transportation Regulation notes that implementation of the Transportation Protective Services procedures for commercial carriers will be in accordance with the MFTURP-1.

program.⁴⁰ The Safety Measurement System within the Compliance, Safety, Accountability program is a data-driven approach for identifying carriers at risk of presenting a safety hazard or causing a crash. Safety Measurement System data comprise information collected during roadside inspections and from reported crashes to calculate scores across seven categories that quantify a carrier's safety performance relative to that of other carriers. Specifically, the categories are: unsafe driving, crash indicator, hours of service compliance, driver fitness, controlled substances/alcohol, vehicle maintenance, and HAZMAT compliance.⁴¹ The Federal Motor Carrier Safety Administration calculates violation rates in each of these categories for each commercial carrier and then compares these rates to other carriers.

DOT uses the Safety Measurement System scores to, among other things, establish safety performance thresholds for carriers. For example, for HAZMAT commercial carriers, DOT establishes a threshold score of 60 or lower (lower scores are better) in each of three categories: unsafe driving, crash indicator, and hours-of-service compliance. DOT's Federal Motor Carrier Safety Administration identifies carriers who score above the threshold as those posing the greatest safety risk. The Federal Motor Carrier Safety Administration can then intervene to focus on specific safety behaviors. The Federal Motor Carrier Safety Administration intervention actions include sending warning letters, conducting on- and off-site investigations, fines, or placing the carrier out of service.

DOD uses DOT's Safety Measurement System scores to determine whether commercial carriers are eligible for transporting HAZMAT under the department's Transportation Protective Services program. For all but

⁴⁰As part of a limited request for exemption submitted to DOT from certain hours-of-service rules, Surface Deployment and Distribution Command noted that it has instituted several technical and administrative controls to ensure the efficient transportation of cargo requiring protective services—including conducting review of carrier compliance requirements and procedures for moving HAZMAT; evaluating carrier authority to operate on U.S. roadways; evaluating carrier compliance with Federal Motor Carrier Safety Administration's Compliance Safety Accountability program and Safety Measurement System standards; providing over-the-road vehicle surveillance; and inspecting carrier facilities and corporate headquarters for compliance with DOD and DOT standards. See 78 Fed. Reg. 64,265, 64,266 (Oct. 28, 2013).

⁴¹For each of the categories, information is based on state-reported data. For example, the Unsafe Driving category looks at driving violations like speeding or reckless driving. The crash indicator is based on the carrier's crash history. Driver's fitness looks at the drivers' training, experience, and medical qualifications.

one of the seven Safety Measurement System categories, DOD requires that commercial carriers seeking to provide certain Transportation Protective Services meet DOT's established HAZMAT carrier thresholds. For compliance with the Safety Measurement System HAZMAT regulations category, however, DOT establishes a threshold score no higher than 80 for commercial carriers. In contrast, DOD requires a more-stringent score of 75. At the time of our review, only 53 of the over 400,000 commercial carriers in the United States had been selected to participate in the Transportation Protective Services program.

In February 2014,⁴² we found that the Federal Motor Carrier Safety Administration faces challenges in reliably assessing safety risk for the majority of carriers. Among other things, most carriers lack sufficient safety performance data to ensure that Federal Motor Carrier Safety Administration can reliably compare them with other carriers using Safety Measurement System scores. Basing an assessment of a carrier's safety performance on limited data may misrepresent the safety status of carriers, particularly those without sufficient data from which to reliably draw such a conclusion. In addition, previous evaluations of the Safety Measurement System have focused on estimating the correlations between crash risk and regulatory violation rates and Safety Measurement System scores. These evaluations have found mixed evidence that Safety Measurement System scores predict crash risk with a high degree of precision for specific carriers or groups of carriers. As we found, according to the Federal Motor Carrier Safety Administration's own methodology, the Safety Measurement System is intended to prioritize intervention resources, identify and monitor carrier safety problems, and support the safety fitness determination process.⁴³ The Federal Motor Carrier Safety Administration also includes a disclaimer with the publicly released Safety Measurement System scores stating that the data are intended for agency and law-enforcement purposes, and readers should not draw safety conclusions about a carrier's safety condition based on the Safety Measurement System score, but rather the carrier's official safety rating. Due to ongoing litigation related to the Compliance, Safety,

⁴²GAO, *Federal Motor Carrier Safety: Modifying the Compliance, Safety, Accountability Program Would Improve the Ability to Identify High Risk Carriers*, [GAO-14-114](#) (Washington, D.C.: Feb. 3, 2014).

⁴³Carrier Safety Administration, *Carrier Safety Measurement System Methodology*, ver. 3.0.1 (Revised August 2013).

Accountability program and the publication of Safety Measurement System scores, we did not assess the potential effects or tradeoffs resulting from the display or any public use of these scores.⁴⁴ We recommended that DOT improve the Compliance, Safety, Accountability program by revising the Safety Measurement System methodology to better account for limitations in drawing comparisons of safety performance information across carriers; and in doing so, conduct a formal analysis that specifically identifies, among other things, the limitations in the data used to calculate Safety Measurement System scores including variability in the carrier population and the quality and quantity of data available for carrier safety performance assessments. According to federal internal control standards, for an entity to run and control its operations, it must have relevant, reliable, and timely communications, including operational data.⁴⁵ Program managers need operational data to determine whether they are meeting their agencies' goals for accountability, and effective and efficient use of resources.

DOT agreed to consider our February 2014 recommendations, but expressed what it described as significant and substantive disagreements with some aspects of our analysis and conclusions. To the extent that DOT makes changes to the Safety Measurement System methodology, this could also affect how DOD uses the information to evaluate Transportation Protective Services carriers' safety performance because of the underlying data reliability concerns with the Compliance, Safety, Accountability program's Safety Measurement System data.

⁴⁴See *Alliance for Safe, Efficient and Competitive Truck Transportation v. FMCSA*, No. 12-1305, D.C. Cir. (filed July 16, 2012; oral argument Sept. 10, 2013). The litigation has been brought against FMCSA by a number of motor carrier trade associations and challenges, among other things, the agency's public disclosure of the Safety Measurement System scores and its encouragement of the use of these public data to help make sound business judgments. The carriers have requested the court to order that the Safety Measurement System scores not be publicly available until alleged flaws in the methodology are addressed in the context of the planned rulemaking. Under GAO's policy to avoid addressing the merits of matters pending in litigation, we did not assess these matters.

⁴⁵[GAO/AIMD-00-21.3.1](#)

Conclusions

The complex framework governing the handling, labeling, and packaging of DOD's HAZMAT shipments exists to ensure the safe, timely, and cost-effective handling of these materials, but its complexity creates challenges as shippers, carriers, and receivers implement the various statutes and regulations of that framework. The distributed nature of this framework—policies and procedures drawn from various organizations, varying by class of HAZMAT and mode of transportation, and executed by multiple players—creates conditions under which mistakes can be made, particularly regarding pre-transportation functions (e.g., packaging and labeling). While DOD has issued regulations and other guidance regarding the handling of HAZMAT, it lacks adequate internal controls to help ensure that its actions are consistent with those regulations and guidance. Furthermore, the department lacks a clear understanding of why these pre-transportation mistakes keep occurring. Absent a better understanding of the root causes for these mistakes, the department will be unable to identify corrective actions to better ensure the safe, timely, and cost-effective transportation of its HAZMAT shipments. Moreover, absent a department-wide process to identify necessary corrective action to ensure that DOD installations provide access to secure hold, there is no assurance that the installations will not repeatedly deny access to the secure hold area for HAZMAT shipments or fail to assist carriers in finding alternative means to secure those shipments. While the relative scale of these incidents is fairly small, the nature of HAZMAT shipments is such that the risk to public safety as well as the potential impact of cost and timeliness should be minimized to the greatest extent practicable. DOD uses Safety Measurement System scores to determine safety performance of its Transportation Protective Services carriers. However, both our February 2014 report and the Federal Motor Carrier Safety Administration state that these scores should not be used to draw safety conclusions about a carrier's safety condition. As a result, DOD may be determining which carriers should be eligible for the Transportation Protective Services program using the Compliance, Safety, Accountability's Safety Measurement System that, for many carriers, lacks sufficient information to reliably assess carriers' safety performance.

Recommendations for Executive Action

To improve DOD's compliance with HAZMAT regulations and other guidance and potentially reduce shipment delays, we recommend that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct the Under Secretary of Defense for Acquisition, Technology and Logistics, in collaboration with the military departments and TRANSCOM, to identify the root causes of improper documentation and packaging of HAZMAT throughout the DOD transportation system, identify any needed corrective actions, and develop an action plan with associated milestones to implement those corrective actions.

To minimize the time sensitive arms, ammunition, and explosives shipments spend in public areas, we recommend that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct the Secretaries of the military departments, in collaboration with TRANSCOM, to establish a process to identify and implement the necessary corrective actions to ensure that DOD installations identified by Surface Deployment and Distribution Command's Emergency Response Reports provide secure hold for sensitive shipments or assist them in locating the nearest alternate means to secure those shipments.

To better ensure the safety and security of DOD's shipments of sensitive arms, ammunition, and explosives, we recommend that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct TRANSCOM to examine the data limitations of the DOT Federal Motor Carrier Safety Administration's Safety Measurement System raised in our February 2014 report on modifying DOT's Compliance, Safety, and Accountability program and determine what changes, if any, should be made to the process used by DOD to decide HAZMAT carrier eligibility and evaluate performance for the Transportation Protective Services program.

Agency Comments and Our Evaluation

We provided a draft of our report to DOD and DOT for review. In written comments, DOD partially concurred with our first recommendation and fully concurred with our second and third recommendations. DOD's written comments are reprinted in their entirety in appendix II. DOD and DOT provided technical comments, which we have incorporated throughout our report as appropriate.

DOD partially concurred with our first recommendation that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct TRANSCOM, in collaboration with the Secretaries of the military departments, to identify the root causes of improper documentation and packaging of HAZMAT throughout the DOD transportation system, identify any needed corrective actions, and develop an action plan with associated milestones to implement those corrective actions. DOD agreed to conduct the analysis we recommended, but stated that the Under Secretary of Defense for Acquisition, Technology, and Logistics rather than TRANSCOM would lead this analysis. DOD explained that, because of the myriad of issues to be addressed, including training and Transportation and Supply Discrepancy Reports, the Under Secretary of Defense for Acquisition, Technology, and Logistics, not TRANSCOM, is the proper organization to lead this analysis. We agree and have amended our first recommendation accordingly.

DOD concurred with our second recommendation that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct the Secretaries of the military departments, in collaboration with TRANSCOM, to establish a process to identify and implement the necessary corrective actions to ensure that DOD installations identified by Surface Deployment and Distribution Command's Emergency Response Reports provide secure hold for sensitive shipments or assist them in locating the nearest alternate means to secure those shipments. Specifically, DOD stated that the Under Secretary of Defense for Intelligence reissued Department of Defense Instruction 5100.76. DOD also noted that the Under Secretary of Defense for Acquisition, Technology and Logistics will work with the Under Secretary of Defense (Intelligence), TRANSCOM, and the military departments to develop corrective actions and operating methods geared toward eliminating secure-hold denials. We agree that these actions, if fully implemented, would address our recommendation.

DOD concurred with our third recommendation that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct TRANSCOM to examine the data limitations of the DOT Federal

Motor Carrier Safety Administration's Safety Measurement System raised in our February 2014 report on modifying DOT's Compliance, Safety, and Accountability program and determine what changes, if any, should be made to the process used by DOD to decide HAZMAT carrier eligibility and evaluate performance for the Transportation Protective Services program. However, DOD did not identify any specific steps it planned to take to address our recommendation.

We are sending copies of this report to the appropriate congressional committees and to the Secretary of Defense and the Secretary of Transportation. The report also is available at no charge on GAO's website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-5431 or russellc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix III.

A handwritten signature in black ink, appearing to read "Cary Russell". The signature is fluid and cursive, with the first name "Cary" written in a larger, more prominent script than the last name "Russell".

Cary Russell
Director
Defense Capabilities and Management

List of Committees

The Honorable Carl Levin
Chairman
The Honorable James M. Inhofe
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Jay Rockefeller
Chairman
The Honorable John Thune
Ranking Member
Committee on Commerce, Science, & Transportation
United States Senate

The Honorable Richard Durbin
Chairman
The Honorable Thad Cochran
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Howard P. "Buck" McKeon
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Bill Shuster
Chairman
The Honorable Nick Rahall
Ranking Member
Committee on Transportation & Infrastructure
House of Representatives

The Honorable Rodney Frelinghuysen
Chairman
The Honorable Pete Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Scope and Methodology

To examine the statutes, regulations, guidance, policies, and procedures that govern the Department of Defense's (DOD) handling, labeling, and packaging of hazardous material (HAZMAT) shipments to support military operations, we reviewed the Hazardous Materials Transportation Act, as amended;¹ regulations issued by the Department of Transportation (DOT), including the Hazardous Materials Regulation in Title 49 of the Code of Federal Regulations;² relevant sections of DOD's Defense Transportation Regulation, Joint Staff guidance, including Joint Publication 4-01, *The Defense Transportation System*;³ and international standards for the transport of HAZMAT. To better understand the statutes, regulations, guidance, policies, and procedures that govern DOD's handling, labeling, and packaging of HAZMAT shipments to support military operations, several members of the audit team completed a 2-day DOD-sponsored course on HAZMAT that covered the above-mentioned areas and passed a comprehensive exam at the end of the course demonstrating their understanding and knowledge of those topics. To corroborate our understanding of this framework, we interviewed officials from the Office of the Deputy Assistant Secretary of Defense for Transportation Policy, Office of the Deputy Assistant Secretary of Defense for Supply Chain Integration, the U.S. Transportation Command (TRANSCOM), and DOT's Pipeline and Hazardous Materials Safety Administration. To understand DOD-specific requirements for transporting HAZMAT shipments, we reviewed DOT's Hazardous Materials Regulations and DOD's Defense Transportation Regulation and interviewed officials from TRANSCOM—specifically, officials from the Surface Deployment and Distribution Command, which is the Army service component command of TRANSCOM that plans, transports, and tracks DOD shipments.

To examine the extent to which DOD faces any challenges in implementing its policies and procedures for transporting HAZMAT in a safe, timely, and cost-effective manner, we selected and visited several DOD locations involved in the transport of HAZMAT, including the U.S. Defense Supply and Distribution Center (Richmond, Virginia);

¹Pub. L. No. 93-633, tit. I (1975) (codified as amended at 49 U.S.C. §§ 5101-5128).

²The Hazardous Materials Regulations are located in parts 171-180 of Title 49 of the *Code of Federal Regulations*.

³Joint Chiefs of Staff, *The Defense Transportation System*, Joint Publication 4-01 (June 6, 2013).

TRANSCOM's Surface Deployment and Distribution Command; and two of DOD's five major aerial ports: Dover Air Force Base (Dover, Delaware) and Norfolk Naval Base (Norfolk, Virginia). Additionally, we interviewed officials from another major aerial port—Travis Air Force Base (Fairfield, California). We also visited Aberdeen Proving Ground (Aberdeen, Maryland) to review the transport of arms, ammunitions, and explosives, and to visit a secure hold location for that type of HAZMAT. We selected these locations because they provided a cross section of the various modes of transportation and hazardous-material classes. We also selected these locations because they provided us with information on the various central locations through which DOD transports these materials. We focused our review on surface and air modes of transport—on surface transport because most individual shipments are transported by highway (94 percent of all shipments in fiscal year 2013) and on air transport because that mode generally has more-restrictive requirements, for example the quantity of certain HAZMAT (like acetic acid, class 8 HAZMAT) allowed on passenger air transport is lower than in other modes. We reviewed data from TRANSCOM's Global Air Transportation Execution System for 5 fiscal years (fiscal years 2009 through 2013) and the Defense Transportation Tracking System for fiscal years 2012 and 2013 to analyze records related to pretransportation and transportation functions (e.g., handling, labeling, and packaging activities and the transport of HAZMAT in commerce to the final destination point), respectively. We compared data from those records with requirements in the Defense Transportation Regulation. We found that the data we examined were sufficiently reliable for identifying challenges and the extent to which they affect the transport of HAZMAT.

We examined sections of the Hazardous Materials Regulations and the Defense Transportation Regulation related to documenting and packaging HAZMAT and to ensuring the secure hold of sensitive and high-risk HAZMAT at DOD installations. We compared those sections with records we examined related to pretransportation and transportation functions (e.g., handling, labeling, and packaging activities and the transport of HAZMAT in commerce to the final destination point). Specifically, we reviewed fiscal years 2009 to 2013 records from TRANSCOM's Air Mobility Command's Global Air Transportation Execution System database, which is the aerial port operations and management information system designed to support automated shipments and passenger processing. We also reviewed data from fiscal year 2012 and 2013 from the Emergency Response Reports provided from the Defense Transportation Tracking System, part of TRANSCOM's Surface Deployment and Distribution Command, which catalogs

information involving shipments of arms, ammunition and explosives, and other sensitive cargo. We found that the data we examined were sufficiently reliable to identify secure-hold access issues that had been reported. We reviewed records from DOT's Federal Motor Carrier Safety Administration to understand the Compliance Safety and Accountability systems and how the safety scores generated by the system are used to evaluate the Transportation Protective Services' 53 carriers that transport DOD's sensitive arms, ammunition, and explosives shipments. To corroborate our understanding of the documents and data we analyzed, we interviewed officials from the Office of the Secretary of Defense; the Office of the Deputy Assistant Secretary of Defense for Transportation Policy; the Defense Logistics Agency; the Army, the Air Force, the Navy, the Marine Corps; and DOT's Pipeline and Hazardous Materials Safety Administration.

We visited or contacted officials from the following DOD and DOT organizations during our review:

- Defense Logistics Agency, Aviation Branch, Richmond, Virginia;
- Defense Logistics Agency, U.S. Defense Supply and Distribution Center, Richmond, Virginia;
- Headquarters, Defense Logistics Agency, Fort Belvoir, Virginia;
- Headquarters, Department of the Army, Pentagon, Arlington, Virginia;
- Headquarters, U.S. Marine Corps, Naval Annex, Arlington, Virginia;
- Office of the Under Secretary of Defense (Acquisition, Technology and Logistics), Office of the Deputy Assistant Secretary of Defense (Transportation Policy), Mark Center, Alexandria, Virginia;
- Office of the Under Secretary of Defense (Acquisition, Technology and Logistics), Office of the Deputy Assistant Secretary of Defense (Supply Chain Integration), Mark Center, Alexandria, Virginia;
- U.S. Air Force, Dover Air Force Base, Dover, Delaware;
- U.S. Air Force, Travis Air Force Base, Fairfield, California;
- U.S. Air Force, Headquarters Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio;
- U.S. Army Operations Center, Pentagon, Arlington, Virginia;
- U.S. Army, Public Health Command, Army Institute of Public Health, Aberdeen Proving Ground, Maryland;
- U.S. Army, Surface Deployment and Distribution Command, 596th Transportation Brigade, Sunny Point, North Carolina;
- U.S. Army, Surface Deployment and Distribution Command, 597th Transportation Brigade, Fort Eustis, Virginia;
- U.S. Army Sustainment Command, Rock Island Arsenal, Rock Island, Illinois;

-
- U.S. Army Medical Command, Fort Sam Houston, San Antonio, Texas;
 - U.S. Army, Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, Aberdeen, Maryland;
 - U.S. Navy, Naval Station Norfolk, Norfolk, Virginia;
 - U.S. Transportation Command, Scott Air Force Base, Illinois;
 - Air Mobility Command;
 - Military Sealift Command;
 - Surface Deployment and Distribution Command;
 - Defense Transportation Tracking System Office; and
 - U.S. Department of Transportation, Washington, D.C.

We conducted this performance audit from April 2013 to May 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the Department of Defense



LOGISTICS AND
MATERIEL READINESS

ASSISTANT SECRETARY OF DEFENSE
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

APR 21 2014

Mr. Cary Russell
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Mr. Russell:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-14-375, "DEFENSE TRANSPORTATION: DoD Needs to Take Actions to Improve the Transportation of Hazardous Materiel Shipments" dated March 31, 2014 (GAO Code 351811). Detailed comments on the report recommendations are enclosed.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul D. Peters", is located below the "Sincerely," text.

Paul D. Peters
Acting

Enclosure:
As stated

GAO DRAFT REPORT DATED MARCH 31, 2014
GAO-14-375 (GAO CODE 351811)

**“DEFENSE TRANSPORTATION: DOD NEEDS
TO TAKE ACTIONS TO IMPROVE THE
TRANSPORTATION OF HAZARDOUS MATERIAL
SHIPMENTS”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS**

RECOMMENDATION 1: To improve DoD’s compliance with hazmat regulations and other guidance and potentially reduce shipment delays, GAO recommends that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct TRANSCOM, in collaboration with the military services, to identify the root causes of improper documentation and packaging of hazmat throughout the DoD transportation system, identify any needed corrective actions, and develop an action plan with associated milestones to implement those corrective actions.

DoD RESPONSE: Partially Concur. The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)) will take the lead, in coordination with the Joint Staff, USTRANSCOM, and the Military Departments to identify the root cause of improper documentation and packaging of HAZMAT throughout the DoD transportation system, and identify corrective actions with an action plan and milestones. Because of the myriad of issues to be addressed, including training and Transportation and Supply Discrepancy Reports, USD (AT&L), not USTRANSCOM, is the proper organization to lead this analysis.

RECOMMENDATION 2: To minimize the time sensitive arms, ammunition, and explosives shipments spend in public areas, GAO recommends that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct the Secretaries of Military Services, in collaboration with TRANSCOM, to establish a process to identify and implement the necessary corrective actions to ensure that DoD installations identified by Surface Deployment and Distribution Command’s Emergency Response Reports provide secure hold for sensitive shipments or assist them in locating the nearest alternate means to secure those shipments.

DoD RESPONSE: Concur. The Under Secretary of Defense for Intelligence re-issued Department of Defense Instruction (DoDI) 5100.76 “Physical Security of Sensitive Conventional Arms, Ammunition and Explosives (AA&E)” on February 28, 2014 to reinforce that DoD Component Heads are responsible for accepting AA&E shipments after normal duty hours for secure hold. DoDI 5100.76 specifies that shipments of DoD AA&E arriving at DoD installations after normal working hours and/or during non-delivery hours shall be accepted by consignees and provided appropriate secure holding protection commensurate with the sensitivity category of the delivered items. USD AT&L will work with USD (Intelligence), USTRANSCOM, and the Military

2

Departments to develop corrective actions and operating methods geared towards eliminating secure-hold denials.

RECOMMENDATION 3: To better ensure the safety and security of DoD's shipments of sensitive arms, ammunition, and explosives, GAO recommends that the Secretary of Defense, in coordination with the Chairman of the Joint Chiefs of Staff, direct TRANSCOM to examine the data limitations of the DOT Federal Motor Carrier Safety Administration's Safety Measurement System raised in our February 2014 report on modifying DOT's Compliance, Safety, and Accountability program and determine what changes, if any, should be made to the process used by DoD to decide hazmat carrier eligibility and evaluate performance for the Transportation Protective Services program.

DoD RESPONSE: Concur.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Cary Russell, (202) 512-5431 or russellc@gao.gov

Staff Acknowledgments

In addition to the contact named above, James A. Reynolds, Assistant Director; Adam Anguiano; Alfonso Garcia; Brandon Jones; Mae Jones; Oscar W. Mardis; Terry Richardson; and Michael Shaughnessy made key contributions to this report.

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